

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:

Wood et al.

Serial No.: 10/666,742

Filed: September 19, 2003

For: METHODS FOR THINNING
SEMICONDUCTOR SUBSTRATES THAT
EMPLOY SUPPORT STRUCTURES FORMED
ON THE SUBSTRATES (Amended)

Confirmation No.: 6057

Examiner: A. Ghyka

Group Art Unit: 2812

Attorney Docket No.: 2269-6095US

VIA ELECTRONIC FILING

January 10, 2008

PRE-APPEAL BRIEF

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Examiners:

This Pre-Appeal Brief follows the final Office Action of October 10, 2007, and the Advisory Action of December 28, 2007. This Pre-Appeal Brief is being submitted within the shortened statutory period for responding to the final Office Action, and in accordance with the requirements of the Pre-Appeal Brief Conference Pilot Program (*see* 1296 Off. Gaz. Pat. Office 67, July 12, 2005) and is being submitted concurrently with a Notice of Appeal.

REMARKS

Claims 17-20, 23-34, and 70-98 are currently pending and under consideration in the above-referenced application. Claims 17-20 and 23-34 have been allowed and claims 75 and 87 are drawn to allowable subject matter. Final rejections have been presented against claims 70-74, 76-86, and 88-98.

The following ground of rejection has been presented in the final rejection:

Claims 70-74, 76-86, and 88-98 have been rejected under 35 U.S.C. § 103(a) for being drawn to subject matter that is allegedly unpatentable over that taught in U.S. Patent 5,354,695 to Leedy et al. (hereinafter "Leedy"), in view of teachings from U.S. Patent 6,562,661 to Grigg (hereinafter "Grigg") and the subject matter taught in U.S. Patent 6,524,881 to Tandy et al. (hereinafter "Tandy").

Independent claim 70 is drawn to a process that requires "**molding** a support structure on an active surface of [a] semiconductor substrate..." (emphasis supplied).

It is respectfully submitted that, in the final rejections of the claims of the above-referenced application, the Examiner has erred in at least one respect: no apparent reason has been provided as to why one of ordinary skill in the art would have combined teachings from Leedy, Grigg, and Tandy to provide a process in which a support structure is molded onto an active surface of a semiconductor substrate.

In the process that has been disclosed in Leedy, a preformed structure is secured to, not molded onto, an active surface of a substrate. Col. 8, lines 48-52; FIG. 1f. The teachings of Grigg are limited to use of so-called "stereolithography" processes, which do not involve molding, to fabricate stiffeners on a tape substrate. The teachings of Tandy relate to a process by which a laser-markable tape is secured to, not molded onto, the backside 12 of a wafer 10. Fig. 4A; col. 6, lines 44-49. None of Leedy, Grigg, or Tandy teaches or suggests a process that includes molding.

Moreover, it is respectfully submitted that, without the hindsight from which the Examiner has benefited, there would have been no motivation for one of ordinary skill in the art to combine teachings from Leedy, Grigg, and Tandy in such a way as to render obvious the subject matter recited in independent claim 70, nor has the Examiner provided any apparent reason that one of ordinary skill in

reason that one of ordinary skill in the art would have been motivated to combine teachings from these references.

It has been asserted that “all of the references pertain to making semiconductors...” Final Office Action, page 7. This assertion overlooks the fact that “making semiconductors” is a broad field that includes a large number of separate and distinct processes that employ different techniques. In combining teachings from Leedy, Grigg, and Tandy, the Examiner has attempted to combine teachings from separate fields within the general field of “making semiconductors”: thinning; the manufacture of flexible carrier substrates; and wafer marking, respectively.

Even overlooking the fact that the three cited references pertain to three different fields, it is respectfully submitted that one of ordinary skill in the art wouldn’t have been motivated to combine their teachings to develop the method recited in independent claim 70 since none of the cited references teaches or suggests “molding” a support structure.

Therefore, the teachings of Leedy, Grigg, and Tandy do not support a *prima facie* case of obviousness against the subject matter to which independent claim 70 is drawn. As such, under 35 U.S.C. § 103(a), the subject matter to which independent claim 70 is drawn is allowable over the teachings of Leedy, Grigg, and Tandy.

Claims 71-74 and 76-81 are each allowable, among other reasons, for depending directly or indirectly from independent claim 70, which is allowable.

Independent claim 82 is drawn to a substrate thinning (*e.g.*, back grinding) process that includes securing a semiconductor substrate to a platen. An active surface of the semiconductor substrate must face the platen, with a support structure on the active surface abutting either the platen or a feature on the platen. Once the semiconductor substrate is secured to the platen in this manner, material is removed from the back side of the substrate.

The process of Leedy includes the formation of a frame 18 as material is removed from the back side of a substrate 10 and, thus, as the substrate 10 is thinned. Col. 7, line 17, to col. 8, line 14; Figs. 1a and 1b. Since the frame 18 is on the back side of the substrate 10 (col. 7, lines 51-52; Figs. 1a and 1b) and is formed as material is removed from the substrate 10’s back side, it could not abut a platen or a feature on the platen as the substrate 10 is thinned. While Leedy teaches that a bonding

Leedy teaches that a bonding frame or ring 19 may be secured to an active surface of the substrate 10, Leedy only teaches that the bonding frame or ring 19 may be secured to the active surface of the substrate 10 *after* the substrate 10 has been thinned. Col. 8, lines 48-52. Thus, Leedy does not teach or suggest removing material from the back side of a substrate while a support structure on the active surface of the substrate abuts a platen or a feature on a platen, as is required of the method of independent claim 82.

Grigg includes no teaching or suggestion that material may be removed from either side of the flexible substrate disclosed therein, let alone that material may be removed as a support structure on one surface of the flexible substrate abuts a platen or a feature on the platen.

The teachings of Tandy that relate to the removal of material from the back side of a semiconductor wafer are limited to securing a front side of the wafer 10 to a platen 56, which provides physical support for the wafer 10 as a grinding wheel 52 removes material from the back side of the wafer 10. Col. 5, lines 30-34; FIG. 2. Tandy does not teach or suggest that a support structure of any type is secured to the front side of the wafer 10, or even between the wafer 10 and the platen 56, during the backgrinding process. Therefore, Tandy does not teach or suggest that material may be removed from the wafer 10 while a support structure on the front side of the wafer abuts the platen 56 or a feature on the platen 56, as required by independent claim 82.

From the foregoing, it is evident that none of Leedy, Grigg, or Tandy teaches or suggests the element of independent claim 82 requiring that a support structure on an active surface of a substrate abut a platen or a feature on the platen as material is removed from the back side of the substrate.

Moreover, since none of Leedy, Grigg, or Tandy identifies any shortcomings with the wafer thinning processes of Leedy and Tandy, and since the Examiner has not identified any apparent reason to modify any of these processes, or any other support for the assertion that one of ordinary skill in the art would have been motivated to support a wafer before material is removed from the wafer (*e.g.*, in the manner recited in independent claim 82), it is respectfully submitted that without the benefit of

submitted that without the benefit of hindsight, one of ordinary skill in the art wouldn't have been motivated to combine teachings from Leedy, Grigg, and Tandy in the manner that has been asserted by the Examiner.

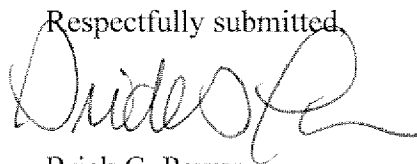
In view of the foregoing, it is respectfully submitted that the Examiner has not established a *prima facie* case of obviousness against the subject matter recited in independent claim 82, or in any of claims 83-86 or 88-98 depending therefrom, as would be required to maintain the 35 U.S.C. § 103(a) rejections of these claims.

It is respectfully requested that the 35 U.S.C. § 103(a) rejections of claims 70-74, 76-86, and 88-98 be reversed, and that each of these claims be allowed.

CONCLUSION

It is respectfully submitted that the rejections of claims 70-74, 76-86, and 88-98 are clearly erroneous and, as such, the Examiner has not met his burden in setting forth *prima facie* rejections against any of these claims. Accordingly, it is respectfully requested that the final rejections of claims 70-74, 76-86, and 88-98 be reversed and that each of these claims be allowed.

Respectfully submitted,



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